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REMARKS

In view of the following discussion, the Applicant submits that none of the claims now pending in the application is made obvious under the provisions of 35 U.S.C. § 103. Thus, the Applicant believes that all of these claims are now in allowable form.

I. REJECTION OF CLAIMS 1-18 AND 22-29 UNDER 35 U.S.C. § 103

The Examiner has again rejected claims 1-18 and 22-29 in Paragraphs 8-14 of the Final Office Action as being unpatentable over the Oshima et al. patent (WO 98/27553, published June 25, 1998 herein referred to as Oshima) in view of the Microsoft Press Computer Dictionary and in view of Inoue patent (United States Patent No. 5,195,134, issued March 16, 1993). The Applicant respectfully disagrees.

The Examiner's attention is directed to the fact that Oshima and Inoue (either singly or in any permissible combination) fail to disclose or suggest the novel invention of securing an information stream, where the information stream is segmented first, then compressed using prediction-based compression, as claimed in Applicant's independent claims. Specifically, Applicant's independent claims positively recite:

1. A method for securing an information stream comprising a sequence of image frames, said method comprising the steps of:
 segmenting said information stream into a plurality of information stream segments having a first segment sequence, each of said information stream segments comprising a plurality of image frames;
 compressing said image frames after said segmenting step by employing prediction-based compression in forming said information stream segments;
 re-sequencing said information stream segments to produce a re-sequenced information stream having a second segment sequence, said first segment sequence being related to said second segment sequence by an index;
 and
 encrypting said re-sequenced information stream and said index.
(emphasis added)

15. A method for recovering image frames from an information stream formed according to the securing method of claim 1, said method for recovering

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comprising the steps of:

recovering said index relating said second segment sequence to said first segment sequence;

decrypting said encrypted information stream segments to produce corresponding decrypted information stream segments;

re-sequencing, using said recovered index, said decrypted information stream segments; and

decompressing, after said re-sequencing step using a prediction-based decompression process associated with said compression process, said compressed image frames included within said decrypted information stream segments. (emphasis added)

23. A method for recovering an information stream having a first segment sequence from an encrypted re-sequenced information stream having a second segment sequence, said method comprising the steps of:

recovering an index relating said second segment sequence to said first segment sequence;

decrypting said encrypted information segments to form respective decrypted information segments;

re-sequencing, using said recovered index, said decrypted information segments to form an information stream comprising a plurality of image segments arranged according to said first segment sequence; and

decompressing after said re-sequencing step a plurality of image frames forming each of said information stream segments by employing prediction-based decompression. (emphasis added)

24. An apparatus comprising:

a segmentation module, for segmenting an information stream into a plurality of information stream segments, said information stream segments arranged according to a first segment sequence, each of said information stream segments comprising a plurality of image frames;

a compression module, for compressing said image frames after said segmenting step by employing prediction-based compression in forming said information stream segments;

a re-sequencing module, for re-arranging according to a second segment sequence, said information stream segments including said compressed image frames, said first segment sequence being related to said second segment sequence by an index; and

an encryption module, for encrypting said re-sequenced information stream segments and said index. (emphasis added)

Applicant's invention is directed to a method and apparatus for securing an

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information stream by dividing the information stream into a collection of segments and compressing the segments, rearranging the order of the segments and encrypting the segments prior to, e.g., distributing the encrypted segments to one or more users within an information distribution system. Specifically, in one embodiment of the invention, an input information stream is divided into a collection of information segments, the individual segments are then compressed and arranged in a non-standard (i.e., scrambled) manner to produce a scrambled collection of information segments and an associated index table suitable for use in rearranging the collection of information segments into a standard (i.e., unscrambled) order.

It is important to the understanding of the present invention to note that the purpose of the segmentation module 110A and the re-sequencing module 115A is to rearrange, in a seemingly random manner, e.g., the video and/or audio information associated with an underlying audio-video information stream such that the presentation continuity of the underlying audio-video information is destroyed. That is, the segmentation module 110A and the re-sequencing module 115A remove the temporal continuity of the underlying audio video information in a manner that renders the audio-video information unusable, or at least unenjoyable, to a pirate or unauthorized subscriber. Thus, the initial segmentation step prior to compression greatly increases the security of the present segment-based protection scheme.

In contrast, the alleged combination completely fails to even teach or suggest this initial segmentation step. Both Oshima and Inoue have absolutely no disclosure pertaining to a segmentation step prior to compressing the input stream. Specifically, Oshima states that:

The video output signal of the watermark portion 34 is sent to the output portion 42. If the broadcasting apparatus 28 broadcasts a compressed video signal, the video output signal is compressed with an MPEG encoder 43, scrambled with a scrambler 45 using the system operator's own encryption key 44 and broadcast from the broadcasting portion 46 to the audience via a network or radio waves. In this case, the compression parameter information, such as the transfer rate after the original MPEG signal has been compressed, is sent from the MPEG decoder 33 to the MPEG encoder 43, so that the compression ratio can be increased even with real-time encoding. Moreover, the compressed audio signal 48 can bypass the watermark portion 34 to avoid expansion and compression, so that a deterioration of the audio quality can be avoided. (See Oshima (in

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its corresponding US patent 6,266,299), Column 36, line 64-Column 37 line 11)

Thus, clearly Oshima does not segment the input stream before performing compression. This substantial gap is also not bridged by Inoue since Inoue is also silent on this matter. Thus, even if the alleged combination is allowed, the alleged combination on its face still fails to make Applicant's invention obvious.

Furthermore, the Inoue arrangement also does not disclose or suggest "compressing image frames". In contrast to Applicant's invention, Inoue discloses, that "[t]he video signal which is transmitted from the video, audio, and digital audio signal transmission device to the scramblers is of NTSC format, and scrambled by line shuffling, using frame memory" (column 4 lines 7-11). The Inoue arrangement simply rearranges video lines without the step of compressing the video lines. Thus, clearly Inoue teaches away from Oshima because clearly Inoue operates in the NTSC environment and Oshima operates in the digital environment. Criticalities addressed in the NTSC and digital environments are completely different and solutions are completely different. Thus, the Examiner has failed to present a prima facie case of obviousness in combining Oshima with Inoue to arrive at the claimed invention.

In the Final Office Action and the Advisory Action, the Examiner appeared to be receptive to Applicant's arguments. However, the Examiner alleged in Paragraph 3 of the Final Office Action and the Advisory Action that "it is noted that the features upon which applicant relies (i.e., segmenting data before compression; the image frames in the claims are compressed, but not necessarily after they have been segmented and rearranged) are not recited in the rejected claim(s)".

Responsive to the Examiner, Applicant has amended the independent claims with the following terms: "after said segmenting step" or "after said re-sequencing step" to clearly clarify the processing order. Thus, the cited references would not make Applicant's invention obvious. Additionally, since the Applicant has consistently maintained that this limitation already existed in the independent claims, Applicant submits that this "clarifying" amendment should not trigger a limitation in the application of doctrine of equivalents to Applicant's claims.

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Since the references, either singly or in combination, fail to disclose or suggest the claimed invention, it is respectfully submitted that the invention of claims 1, 15, 23 and 24 are patentable over the cited references. Therefore, the Applicant submits that claims 1, 15, 23 and 24, as they now stand, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Dependent claims 2-14, 16-18, 22 and 25-29 depend from claims 1, 15 or 23 and recite additional features therefore. As such, and for the exact same reason set forth above, the Applicant submits that none of these claims are obvious with respect to the teachings of the cited references. Therefore, the Applicant submits that all of these dependent claims also fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Conclusion

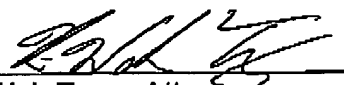
Thus, the Applicant submits that all of these claims now fully satisfy the requirements of 35 U.S.C. §103. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the maintenance of the present final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

9/8/03

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